

Digital Cinema: Observations and Considerations

Is it the next great leap or an invitation to confusion? Business as usual or a completely new model? Digital cinema is at hand, no doubt about it. But just what will it involve? Will it prove to be genuine progress, or technology for its own sake?

Dolby Laboratories has been looking closely at D-cinema issues over the last few years. Drawing on our long experience in merging technological advances with existing systems, we frequently also step back and take a broader view. We have analyzed what will be needed for the transition, what will work well for production houses and exhibitors alike, and especially, what will give audiences an ever-better cinema experience. We recognize concerns about technology, security, quality, reliability, and compatibility. Based on our research, we have reached some general conclusions and developed some more-specific recommendations.

The Need for Dedicated Products

One general conclusion is that D-cinema will need dedicated products. Our Production Services Group has contracted for many of the current D-cinema installations, interfacing the new world of satellites, Ethernet, and megabytes with the existing sprockets, relays, and xenon strikes. This firsthand experience has led us to realize that rolling out D-cinema will take more than just a video projector and a server. The wide variety in existing cinema installations means that a successful rollout will unlikely be accomplished with off-the-shelf equipment repurposed for the cinema industry. Some believe repurposed products will enable our industry to take advantage of the economies of scale afforded by the broadcast or consumer industries. We believe this is not true due to operational and reliability limitations of equipment that was not designed for the cinema. Furthermore, they may not offer the flexibility to support new image formats and other standards as they are established.

The Importance of Open, Global Standards

Having worked in film industries from Hollywood to Paris, Bollywood to Beijing, Dolby has a true understanding of the need for long-lasting and effective international standards. We strongly support open standards that will allow exhibitors to choose among equipment suppliers, yet encourage innovation. We are actively involved in all the significant standards bodies in the US and Europe, helping to define these open standards while cautioning the organizations not to be too restrictive overall, a stance which could stifle competition. Carefully defining the significant interface points—such as an open standard for the encoded movie files—will enable D-cinema system customers to choose among manufacturers while maintaining interoperability.



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From Studio to Screen

Based on our experience in rolling out Dolby® Stereo and Dolby Digital, we're convinced that for any new cinema technology to be successful, it has to be practical enough for adoption throughout the content chain. Film production, distribution, and exhibition are separate industries, each with its own requirements. Creating formats that flow between them is a significant enough challenge when just a single company is providing encoding and decoding equipment, as we do with audio. But when the technology is open to interpretation and implementation by many entities, and as complex as today's digital systems, the need for hand-holding from studio to screen is greater than ever. That is why we are taking a complete system approach in our vision for digital cinema, developing not just cinema playback equipment but also support services, such as mastering and quality control, to help smooth the flow of content and ensure that any solutions are practical to adopt.

Reliability

In developing a new generation of cinema playback equipment, one of our primary goals is to achieve reliability at least equal to today's traditional film systems. Many of our cinema audio processors have outlived the cinemas that housed them, and we see no reason why digital cinema products should be any different. Our completely digital CP650, for example, offers outstanding reliability and provides a benchmark for new products. And even though a digital cinema storage device includes sensitive parts, like hard drives, careful design can result in systems that are resilient to the projection booth environment, and that can continue operation even if individual drives fail.

A Solution to Piracy?

Digital cinema represents a serious threat to the industry—but also a tremendous opportunity. The threat is film piracy, because the digital file is of the ultimate quality. Were it stolen, then the copies on the streets or the Internet would be identical to the director's master—at which point all value vanishes. Furthermore, as the files move from the studio to the distributor to the exhibitor, and are eventually stored in the cinema, the chain has many potential weak spots.

But here's the tremendous opportunity: with careful system design, the digital file can be protected at each stage far more effectively than has ever been possible with the film print. Sophisticated encryption techniques can easily keep the data secure at every step, from the production house all the way to the cinema. Equally, good engineering design of the cinema devices can ensure that the data is never "in the clear"—that is, never unencrypted and extractable.

Finally, as the film is projected, techniques are in development to thwart the camcorder pirate. Until these are viable, current watermarking techniques at least allow tracing where and when the copy was made. To this end, Dolby in 2003 acquired Cinea, a team of content protection experts with significant D-cinema experience.

So security actually represents a big plus for D-cinema. A system that's well thought out from end to end, designed with security in mind from the ground up, gives the industry the unprecedented opportunity to protect content from even the most determined criminal, and from the threat that piracy poses.

Business as Usual? Yes

We must remember that cinema is indeed a business, with business relationships firmly established among distribution, exhibition, and their respective suppliers. In designing a next-generation film presentation system, we will work to enable continuation of current business practices with as little disruption as possible. While D-cinema will eventually simplify certain aspects of both distribution and exhibition, we must be careful not to let technology for its own sake force changes in business practices. Any changes should evolve only with experience, at a pace acceptable to both parties, and only with their active involvement.

The Ultimate Cinema Experience

Dolby's goals have always been twofold: first, to provide filmmakers with tools to tell their stories in the most effective way possible; and second, to make sure as many cinemagoers as possible see the films as their creators intended. We believe that digital cinema will provide multiple opportunities for further innovations within the framework of the open standards currently being discussed by Digital Cinema Initiatives (DCI) and others. We also think that the quality of both picture and sound will continue to improve, and that these improvements will keep audiences coming back for more.

To ensure that our digital cinema systems deliver on the promise of outstanding images, with quality at least as good as the best 35 mm prints, we have steadily built an image technology team already renowned in Hollywood for high-quality video. We were thus able to actively participate with DCI in the evaluation of an image compression system for D-cinema. Beyond much better video and audio, an entirely digital system will provide optimum playback of any film in any cinema, regardless of the film's format or the specifics of the installation. Such flexibility and consistency will be a great improvement over today's presentations.

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Where We're Coming From

Ever since we introduced Dolby Stereo, cinema technology has played a leading role in our company's history. Dolby Stereo brought a practical multichannel sound system within the reach of all cinemas, not just the roadshow houses. We followed with Dolby SR, Dolby Digital, and Dolby Digital Surround EX™—each making the cinematic experience more real and more exciting, each giving customers all the more reason to buy tickets.

Throughout, we've always focused on solutions that will work for all parts of the film industry. We've stressed compatibility, with existing production techniques and in-place exhibition equipment. We've emphasized reliability and cost-effectiveness. As we—and the industry—move toward digital, these same considerations remain in the forefront of our thinking.

Of course, some of our thinking is already evident in our current product range. Our latest cinema sound processor, the CP650, includes digital inputs, Ethernet capability, and the extra processing power that might be needed for a future sound format. These features have already been used in many of the current D-cinema installations, and currently there are almost 13,000 processors out there, ready and waiting. We have also designed two integration products specifically for D-cinema, the DMA8 Digital Media Adapter and the NA10 Network Automation Interface. They help integrate the new formats with existing audio and automation systems.

In Conclusion

Some issues remain for D-cinema, but we believe the industry has the will to resolve them and move forward in the very near future. In the meantime, DCI (together with the standards bodies) is developing what was once considered impossible—a technical specification based on open standards and agreed to by numerous industry experts. The experiments of the past three years have been valuable in determining what works and what doesn't. The roll-out phase is almost here and Dolby hopes to be there with you, offering practical and reliable digital cinema products and services that benefit filmmakers, exhibitors, and especially the audience.